Circle No. 204 on Welding Info-Aid Card

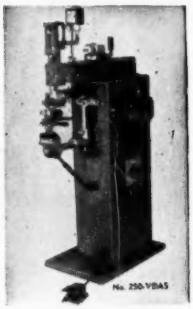
EISLER makes the largest assortment of WELDERS

• ELECTRIC SPOT • WIRE BUTT
• SEAM • TWEEZER • GUN • FLASH
. . . and

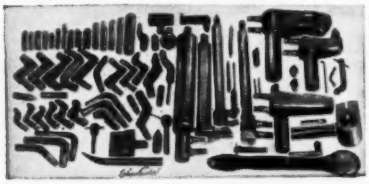
•

We are manufacturers of WELDING TRANSFORMERS and INDEXING TURNTABLES

•



No. 250 VDAS Air Operated Press Type Spot Welder



We also produce and carry in stock a large variety of special and standard welding tips, accessories and water cooled holders.

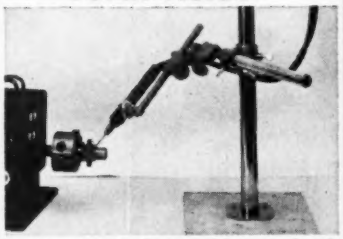
*Write for details!*

EISLER ENGINEERING COMPANY
*Dr. Charles Eisler, M.E., President*
749 So. 13th St., Newark, N.J., U.S.A. 07103

Speed-Up WELDING

*With Superior's new miniature*

Torch Holder



Racking device for precision torch adjustment in automatic welding miniature parts. Will hold ½-in.-round pencil torch to automatic gun. Five adjustable controls, conveniently placed for one hand, finger-tip operation. Worm gear drive works on 16-teeth-per-inch rack for precision movement. Adjusting collar on 24-in. pipe stand holds cross arm at any height in 360 deg turn.

$CO_2$ Wire Drive

Solid state $CO_2$ short-arc wire drive and name brand torch combined. Wire drive is condensed version of Superior's successful Aircrafter wire feeder. Constant rod speeds from 10 to 600 ipm. Wire size from 0.030 to 0.045; no warm up or over heating. Will go through 10 by 12 in. manhole; net weight 27 lb.

**Good Distributer territories still open • Write for details**

*For additional information, write or wire to:*

SUPERIOR WELDING CO.
3410 E. 14th St., Los Angeles 23, Calif.

Circle No. 205 on Welding Info-Aid Card

# YOUR 1966 EDITORIAL INDEX

## WELDING ENGINEER, Volume 51

## January to December, 1966, inclusive

***Editor's Note:** For your convenience, the original titles of all articles appearing in* WELDING ENGINEER *during 1966 have been boldfaced. All other entries are cross-reference only.*

## AUTHORS

Anderson, Nils E., Feb., p. 68; April, p. 115
Antonioli, James, July, p. 72
Bendell, Curtis B., April, p. 56
Blair, R. H., March, p. 82
Blodgett, Omer, July, p. 45
Bratkovich, Nick F., Feb., p. 51
Corrigan, Matthew, June, p. 41
Flynn, Jerry, March, p. 60
Fragomen, Austin T., Nov., p. 41
Garriott, F. Emery, Sept., p. 50; Oct., p. 78
Harris, William J., Dec., p. 52
Holby, Eric, Sept., p. 40
James, W. T., Sept., p. 37
Jefferson, T. B., Jan., p. 46; April, p. 45 and 49; June, p. 64; Fact File, p. 6 and 9; Sept., p. 69; Oct., p. 47
Kamps, Eugene, Feb., p. 86
LaVelle, E. B., Oct., p. 41
McIntyre, Wayne L., Feb., p. 51
Miller, K. J., Sept., p. 46
Norris, John D., Nov., p. 41
Purdy, Robert E., Feb., p. 51
Ratcliff, Michael, Feb., p. 58
Rayve, Richard E., Nov., p. 37
Rosumny, Mark, June, p. 41
Secord, Ivan W., July, p. 76
Shaw, Carl B., June, p. 45
Silver, G. H., Nov., p. 35
Simonson, R. D., Feb., p. 43; March, p. 39; April, p. 63; May, p. 63; June, p. 53; Fact File, p. 12; July, p. 55; Aug., p. 49; Sept., p. 57; Oct., p. 57; Nov., p. 49; Dec., p. 46
Stone, C. C., Oct., p. 41
Stout, D. R., April, p. 116
Thielsch, Helmut, April, p. 72; June, p. 78; Nov., p. 60; Dec., p. 65
Whitmore, Eugene, April, p. 86

## FEATURE ARTICLES

A

**A welded first: twin-hulled oil drilling vessel,** May, p. 54
**Abrasive wear challenged by Tig HF system,** Feb., p. 84
Accidents reduced with safety containers, receptacles, Aug., p. 70
Accumulated fatigue damage measured by new device, Feb., p. 70
**Accurad: quality welds assured in cast aluminum,** Sept., p. 90
Aerospace welding research, April, p. 45
Aircraft engine gears welded with EB, Feb., p. 51
**All-welded buildings solve two 'unique' problems,** Dec., p. 88
Alloy wear strips, abrasion-resistant, Jan., p. 68
**Aluminum autoclave calls for Tig plus wire,** Oct., p. 94
**Aluminum pre-weld,** June, p. 68
Apollo moon project, welded construction in, April, p. 49
Arc and flame hazards, and protection, Feb., p. 72
Architectural awards for welded buildings, Jan., p. 66
**Are you ready for federal emergency controls?,** Oct., p. 90
Assemblies are laser welded, Sept., p. 46
Automated equipment taken to welding site, July, p. 77
Automatic, and semi-automatic welding processes in skyscraper erection, Jan., p. 53
Automatic electrode and equipment positioning in automobile plant, Feb., p. 75
**Automatic positioner speeds welding, handling of freight cars,** April, p. 100
Automation of Tig for thin-metal welding, Nov., p. 35
Automation of welding, fixturing for, Nov., p. 37
AWS adopts weld mark symbol, May, p. 101
AWS Cleveland convention program, exhibitors, April, p. 90
**AWS welding show — 1966,** May, p., 102

Circle No. 204 on Welding Info-Aid Card

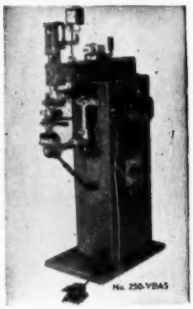
EISLER makes the largest assortment of WELDERS

• ELECTRIC SPOT • WIRE BUTT
• SEAM • TWEEZER • GUN • FLASH
. . . and

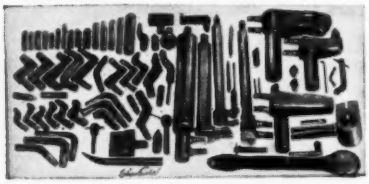
•

We are manufacturers of WELDING TRANSFORMERS and INDEXING TURNTABLES

•



No. 250 VDAS Air Operated Press Type Spot Welder



We also produce and carry in stock a large variety of special and standard welding tips, accessories and water cooled holders.

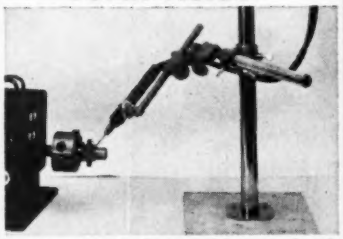
*Write for details!*

EISLER ENGINEERING COMPANY
*Dr. Charles Eisler, M.E., President*
749 So. 13th St., Newark, N.J., U.S.A. 07103

Speed-Up WELDING

*With Superior's new miniature*

Torch Holder



Racking device for precision torch adjustment in automatic welding miniature parts. Will hold ½-in.-round pencil torch to automatic gun. Five adjustable controls, conveniently placed for one hand, finger-tip operation. Worm gear drive works on 16-teeth-per-inch rack for precision movement. Adjusting collar on 24-in. pipe stand holds cross arm at any height in 360 deg turn.

$CO_2$ Wire Drive

Solid state $CO_2$ short-arc wire drive and name brand torch combined. Wire drive is condensed version of Superior's successful Aircrafter wire feeder. Constant rod speeds from 10 to 600 ipm. Wire size from 0.030 to 0.045; no warm up or over heating. Will go through 10 by 12 in. manhole; net weight 27 lb.

**Good Distributer territories still open • Write for details**

*For additional information, write or wire to:*

SUPERIOR WELDING CO.
3410 E. 14th St., Los Angeles 23, Calif.

Circle No. 205 on Welding Info-Aid Card

# YOUR 1966 EDITORIAL INDEX

## WELDING ENGINEER, Volume 51

## January to December, 1966, inclusive

***Editor's Note:** For your convenience, the original titles of all articles appearing in* WELDING ENGINEER *during 1966 have been boldfaced. All other entries are cross-reference only.*

## AUTHORS

Anderson, Nils E., Feb., p. 68; April, p. 115
Antonioli, James, July, p. 72
Bendell, Curtis B., April, p. 56
Blair, R. H., March, p. 82
Blodgett, Omer, July, p. 45
Bratkovich, Nick F., Feb., p. 51
Corrigan, Matthew, June, p. 41
Flynn, Jerry, March, p. 60
Fragomen, Austin T., Nov., p. 41
Garriott, F. Emery, Sept., p. 50; Oct., p. 78
Harris, William J., Dec., p. 52
Holby, Eric, Sept., p. 40
James, W. T., Sept., p. 37
Jefferson, T. B., Jan., p. 46; April, p. 45 and 49; June, p. 64; Fact File, p. 6 and 9; Sept., p. 69; Oct., p. 47
Kamps, Eugene, Feb., p. 86
LaVelle, E. B., Oct., p. 41
McIntyre, Wayne L., Feb., p. 51
Miller, K. J., Sept., p. 46
Norris, John D., Nov., p. 41
Purdy, Robert E., Feb., p. 51
Ratcliff, Michael, Feb., p. 58
Rayve, Richard E., Nov., p. 37
Rosumny, Mark, June, p. 41
Secord, Ivan W., July, p. 76
Shaw, Carl B., June, p. 45
Silver, G. H., Nov., p. 35
Simonson, R. D., Feb., p. 43; March, p. 39; April, p. 63; May, p. 63; June, p. 53; Fact File, p. 12; July, p. 55; Aug., p. 49; Sept., p. 57; Oct., p. 57; Nov., p. 49; Dec., p. 46
Stone, C. C., Oct., p. 41
Stout, D. R., April, p. 116
Thielsch, Helmut, April, p. 72; June, p. 78; Nov., p. 60; Dec., p. 65
Whitmore, Eugene, April, p. 86

## FEATURE ARTICLES

A

**A welded first: twin-hulled oil drilling vessel,** May, p. 54
**Abrasive wear challenged by Tig HF system,** Feb., p. 84
Accidents reduced with safety containers, receptacles, Aug., p. 70
Accumulated fatigue damage measured by new device, Feb., p. 70
**Accurad: quality welds assured in cast aluminum,** Sept., p. 90
Aerospace welding research, April, p. 45
Aircraft engine gears welded with EB, Feb., p. 51
**All-welded buildings solve two 'unique' problems,** Dec., p. 88
Alloy wear strips, abrasion-resistant, Jan., p. 68
**Aluminum autoclave calls for Tig plus wire,** Oct., p. 94
**Aluminum pre-weld,** June, p. 68
Apollo moon project, welded construction in, April, p. 49
Arc and flame hazards, and protection, Feb., p. 72
Architectural awards for welded buildings, Jan., p. 66
**Are you ready for federal emergency controls?,** Oct., p. 90
Assemblies are laser welded, Sept., p. 46
Automated equipment taken to welding site, July, p. 77
Automatic, and semi-automatic welding processes in skyscraper erection, Jan., p. 53
Automatic electrode and equipment positioning in automobile plant, Feb., p. 75
**Automatic positioner speeds welding, handling of freight cars,** April, p. 100
Automation of Tig for thin-metal welding, Nov., p. 35
Automation of welding, fixturing for, Nov., p. 37
AWS adopts weld mark symbol, May, p. 101
AWS Cleveland convention program, exhibitors, April, p. 90
**AWS welding show — 1966,** May, p., 102

**AWS welding show,** June, p. 89

B

**Bi-metal brazing meets space age requirements,** Feb., p. 82
**Brazing copper-nickel alloys,** Feb., p. 64
Bronze, filler metal specifications, Sept., p. 50 (part I); Oct., p. 78 (part II)
Bronze welded sculpture, Jan., p. 67
Bridge design, AISC prize-winning, May, p. 79
Bridge girders welded with automatic on-site equipment, July, p. 77
Bridge maintenance eliminated with Cor-Ten steel, March, p. 54
Bridge, welded steel, outbids concrete, April, p. 94
**Bridges: welded design wins contract, awards,** Dec., p. 72
Building raised with $CO_2$-Mig, March, p. 60
**Buildup, repair of crusher shells,** Oct., p., 66

C

**Cadmium oxide fume,** July, p. 64
Canada's Expo 67, April, p. 112
**Case for 'fabricated' stainless wire,** March, p. 56
Cast aluminum method assures high weld quality, Sept., p. 90
**Chicago's new civic center is welded steel — both frame and exterior,** Jan., p. 56
**'Chiller' improves RW welds and cuts water bills,** Sept., p. 86
**Chrome alloy strips resist abrasion,** Jan., p. 68
**Churches boost modern design with steel and welding,** Aug., p. 68
Classification system for electrodes, Sept., p. 69 (part I); Oct., p. 47 (part II)
**$CO_2$-Mig joins feedwater heater heads,** Aug., p. 73
$CO_2$-Mig used in high rise building, March, p. 60
**$CO_2$ shorting-arc ups rotor production 300%,** April, p. 115
**Community college: weldor source in 19-70s?,** July, p. 72
**Consider cast-weld and composite construction,** Feb., p. 48
Consumable inserts for root pass welding, Nov., p. 78
**Controlled evolution gives functional weldment design,** Feb., p. 53
Convention, AWS, April, p. 90
Cost estimation of welding production, July, p. 45
Costs of automated pressure vessel fabrication examined, Sept., p. 37
Costs of Tig shielding, Sept. p. 40
Costs reduced by redesign of weldment, May, p. 90
**Cracking and ferrite content in austenitic stainless welds,** Dec., p. 66
Crane production relies on semiautomatic $CO_2$-Mig, May, p. 94
Custom-made structurals to customer specs, Jan. p., 62

D

Decompression chamber, welding of, March, p. 74
Defects in fusion and penetration, June, p. 78
Defects, slag and tungsten inclusions, April, p. 72
Defects, weld surface contour variations, Nov., p. 60
Design 'evolution' should take place on drawing board, Feb., p. 58
Design improvement in RW transformer, March, p. 82
Design modification improves hoist production, May, p. 90
Designs of modern churches include welded steel, Aug., p. 68
Design review as a function of NDT, June p., 45
Depreciation of equipment, practices and procedures, March, p. 68
**Development of a crawler tractor structural frame,** April, p. 116
Diesel locomotive wheels hardfaced, March, p. 80
Dissimilar metals brazed for aerospace components, Feb., p. 82
Domes, steel, welded for extra factory space, July, p. 76
Drive sprockets for trenchers flame-cut, June, p. 67
**Dual Tig unit saves money — 'down the line,'** May, p. 98

E

EB, non-vacuum, for aerospace project, May, p. 81
EB welder with partial vacuum makes debut, June, p. 92
**Editorials** — Our golden jubilee, Jan., p. 43; The last chance, Feb., p. 41; Progress thru ignorance, March, p. 37; There's a winner, April, p. 41; Boy, oh boy!, May, p. 49; What price weldors?, June, p. 35; For the record, July, p. 41; Anxious enough to excel, Aug., p. 35; Thinking and doing this fall, Sept., p. 35; The careless few, Oct., p. 39; A time to give thanks, Nov., p. 33; Nearly fifty & one, Dec., p. 37
Eddy current and fluorescent penetration in NDT, June, p. 50
**8-station welders 'divide' a problem,** Aug. p. 64
Electrode report, McKay's vertical-down, Aug., p. 44
Electrode report, on Monel 190 electrodes, Aug., p. 46
Electrodes and filler rods for bronze welding, Sept., p. 50 (part I); Oct., p. 78 (part II)
Electrodes, designations of, Sept., p. 69 (part I); Oct., p. 47 (part II)
Electrodes, wire fabricated for stainless welding, March, p. 56
Electron beam welding provides greater design freedom, Feb., p. 51
**Electronic console controls positioning for automatic line welding,** Feb., p. 75
Electroslag and EB in heavy section welding, March, p. 45
**Eliminate the hazard,** Aug., p. 70
**Engineering data sheets:** No. 305, Estimating weight of electrodes, Jan., p. 73; No. 306, Storage and reconditioning of commonly used electrodes, Feb., p. 63; No. 307, Proper RW spot, seam welding schedules, March, p. 65; No. 308, Flux-cored $CO_2$ welding data, April, p. 103; No. 309, RW schedules for galvanized steel, May, p. 57; No. 310, Radiographic sources for material thicknesses, June, p. 47; No. 311, Welding cost formulas, July, p. 48; No. 312, Managing steel filler metals, Aug., p. 41; No. 313, Trade names of coated copper electrodes and comparable AWS designations, Sept., p. 53; No. 314, Copper wire trade names, Oct., p. 85; No. 315, British electrode classification, Nov., p. 69; No. 316, Calendars — 1776 to 2000, Dec., p. 75.
**Environmental control costs for Tig welding,** Sept., p. 40
**Estimating welding cost,** July, p. 45
Exposed steel applications in building construction, Jan., p. 55
Extrusion tool cuts weld and grinding time, April, p. 82

F

Fabricated structural columns for service stations, Feb., p. 78
Fabrication, automated, for pressure vessels, Sept., p. 37
Fabrication of pressure vessels; best method at one plant, Nov., p. 41
Fabrication project calls for training, preparation, May, p. 86
Federal controls, what to expect, Oct., p. 90
Feedwater heater heads joined by $CO_2$-Mig, Aug., p. 73
**Field welding of galvanized shapes tested,** June, p. 63
**15,000 welds for a bronze sculpture,** Jan., p. 67
**Fifty years of building metal markets,** Feb., p. 86
Fine-wire Mig for pipeline work, Jan., p. 70
**Fire or water damage; pick one,** Nov., p. 70
**First orbiting telescope depends on resistance welded circuits,** April, p. 56
**Fixturing ingenuity, key to fully automatic welding,** Nov., p. 37
Flame-sprayed zinc for metal furniture, Oct., p. 89
**Flame-spraying reduces costs for utility firm,** Feb., p. 80
**Flux-cored Mig welded T-1 steel passes 100-'on test,** Feb., p. 60
**Flux-cored wire, $CO_2$ save costs in Chicago high rise erection,** March, p. 60
**For $1.22 they saved $9,998.78 plus time,** Oct., p. 95
**For safety and economy, rent your uniforms,** July, p. 75
**For solid fuel rocket cases: take maraging steel, add Tig,** April, p. 59
Freight cars positioned with custom equipment, April, p. 100
Fuel element fabrication for nuclear reactors, Feb., p. 88
**Fundamentals of electrode designations,** Sept., p. 69 (part I); Oct., p. 47 (part II)
Future of welding, Fact File, p. 6

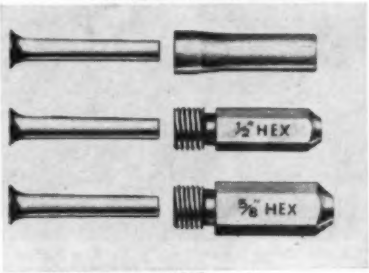
G

**Gage measures fatigue damage,** Feb., p. 70

Circle No. 206 on Welding Info-Aid Card

NOW REPLACEABLE INSERTS NEW

FOR WIRE GUIDES ON SUBMERGED ARC WELDING MACHINES
• DROP-IN INSERTS




- CHANGEABLE INSERT just drop in
- COST SAVINGS BEYOND COMPARISON When the hole wears DROP-IN a new insert
- HIGH QUALITY WELDS with high conductivity insert

ALLIED METAL PRODUCTS CO.
3350 D Street, Philadelphia, Pa. 19134 215: 426-4119

Save time in PIPE FABRICATION use . . . LEE'S LITTLE HELPER RAPAROUND

LEE'S RAPAROUND

A must for welders, fitters and layout men.

More than just an ordinary wrap-around!

Lee's Raparound can be used as a straight edge, square and scale. It is simple to find cutbacks for mitered joints. It has decimal equivalents, protractor, and other useful information for weldors and fitters.

Made of rugged, heat resistant material — all printing in dense black. Every tool kit should have one.

CONTACT YOUR LOCAL WELDING DISTRIBUTOR OR

R. E. LEE CO.
369 Junipero St.
Long Beach, Calif.

Circle No. 207 on Welding Info-Aid Card

Circle No. 208 on Welding Info-Aid Card

**Remove Welding Fumes at the Source... with RUEMELIN FUME COLLECTOR**

Welding shops equipped with Ruemelin Fume Collectors are assured of a clean shop atmosphere. Noxious fumes, heat and smoke are eliminated AT THEIR SOURCE. Improves working conditions . . . lessens fatigue . . . paves the way for increased plant production. Especially helpful in winter months when windows and doors are closed.

Note the new spring-loaded counterbalance mechanism which makes Fume Collectors much easier to handle.

WRITE FOR DETAILED INFORMATION

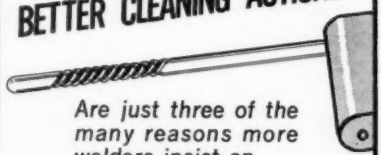
**RUEMELIN MFG. CO.**

3880 N. PALMER STREET • MILWAUKEE 12, WIS., U.S.A.

*Mfrs. & Engineers • Sand Blast & Dust Collecting Equipment*

A8-965?

GUARANTEED NON-BREAKABLE, PRECISION MANUFACTURED TO EXACTING TOLERANCES AND BETTER CLEANING ACTION...



*Are just three of the many reasons more welders insist on*

THERMO Spiral TIP CLEANERS

Use them once and you will discover all of their other superior qualities.

You can get them at all better Welding Supply Dealers. Just look for the . . .

GREEN Anodized case.

THERMACOTE COMPANY
681 So. Raymond Ave., Pasadena, Calif.

Circle No. 209 on Welding Info-Aid Card

Galvanized shapes field-welded and tested, June, p. 63
Galvanized steel, RW schedules, May p. 56
Gary job corps training center, April, p. p. 86
Gas complex, Chicago area, Sept., p. 92
**Gas-shielded arcs and plasma-jet torches,** Feb., p. 72
Gases, shielding, specifications for type of job, May, p. 51
**Getting a weld guarantee on gas pipeline,** Nov., p. 46

H

Hardfacing applications with sub-arc, Mig, March, p. 76
Hardfacing system uses new Tig process, Feb., p. 84
Hawaii, welding in, June, p. 64
Heavy section welding with automatic processes, March, p. 45
**HF turns normal wear into asset,** Aug., p. 43
High-frequency process produces custom-designed structurals, Jan., p. 62
**High-quality welds for diver decompression,** March, p. 74
High strength steel welded in Texas building, overpass, Aug., p. 66
**History of welding** — Prelude, Jan., p. 46; Chapter 1 — On the shoulders of giants, Feb., p. 43; Chapter 2 — Electricity sparks a technology, March, p. 39; Chapter 3 — Resistance becomes a major force in production, April, p. 63; Chapter 4 — Growing up with gas, May, p. 63; Chapter 5—Welding in the war, June, p. 53; Chapter 6 — Out of necessity, an awakening, July, p. 55; Chapter 7 — Twice-told tales of early days, Aug., p. 49; Chapter 8 — Automation comes to welding, Sept., p. 57; Chapter 9 — War needs met again . . . welding reaches maturity, Oct., p. 57; Chapter 10 — Search for new joining processes accelerates, Nov., p. 49; Chapter 11 — The future: building a stairway to the stars, Dec., p. 46
**How EB welds aircraft turbine engine gears,** Feb., p. 51
**How to cut preweld cleaning time 90%+,** Oct., p. 74
Hydraulic pump actuates extrusion tool for savings, April, p. 82

I

**In your plant is welding king . . . or just a mangey mutt?** July, p. 70
Incentives, setting them for your employees, July, p. 43
Inclusions, slag and tungsten, April, p. 72
**Incomplete fusion and lack of penetration,** June, p. 78
Industry receives college-trained weldors, July, p. 72
**Interest barometer,** Fact File, p. 12
**It's a great idea — from NASA,** July, p. 68

J

Japanese develop one-side sub-arc welding for ship construction, March, p. 51
Jefferson, T. B., honored by Mechanics Welding Society, Aug., p. 63
**Job Corps adds weldors to labor market,** April, p. 86

L

**Laser welding . . . three impossible jobs,** Sept., p. 46
**Latest in NDT,** Dec., p. 91
Launch towers, welded, for spacecraft, April, p. 53
**Living pioneers:** Elmer H. Smith, May, p. 72; James W. Owens, June, p. 61; John J. Chyle, July, p. 61; Cyrus K. Rickel, Aug., p. 55; E. A. Hobart, Sept., p. 65; William Stoody, Oct., p. 63; Joseph Holt, Nov., p. 55; Arthur Bernard, Dec., p. 62

M

Machinery replaces castings with welded steel, March, p. 78
**MacKenzie, Louis Burton,** Jan., p. 50
Maintenance and repair performed by flame-spraying, Feb., p. 80
**Make depreciation work for you,** March, p. 66
Magnetic probe for NDT versatile, Nov., p. 44
**Man on moon: via welding technology,** April, p. 49
Manual metar-arc procedures used in Chicago Civic Center, Jan., p. 56
Maraging steel/Tig in spacecraft fuel cases, April, p. 59
Maraging steels, welding of, Aug., p. 37
Mig welding repairs a hammer base, Oct., p. 88
Mig welding, process application and analysis, Oct., p. 41
Mig welding processes replace stick electrodes in crane production, May, p. 94
Mixtures of Mig and Tig gases to suit job, May, p. 51
**'Mobile' units give firm highly mechanized production,** July, p. 77
Monel Rod joins nickel-copper alloys, Aug., p. 46
**Mony tight? funds available,** Dec., p. 76
Multi-station welders aid welding school, Aug., p. 64

N

NASA-developed welding aids, July, p. 68
**National safety congress and exposition,** Oct., p. 52
**Natural gas cuts drive sprockets for trenchers,** June, p. 67
**NDT: a maintenance tool,** June, p. 39
**NDT: A place in design review,** June, p. 45
**NDT: A quick review of eddy current and fluorescent penetration,** June, p. 50
NDT: Angel's stadium, construction tested by ultrasonics, Jan., p. 60
**NDT backstops first three miles to the moon,** April, p. 53
**NDT: Choosing between film radiography, fluoroscopy,** June, p. 41
**NDT: "Sound" reasons for use of ultrasonics,** June, p. 48
**New monel rod replaces three,** Aug., p. 46
**No maintenance for Ohio bridges,** March p. 54
**Non-vacuum EB makes bid for Apollo project,** May, p. 81
**North or south, fine-wire Mig speeds piping,** Jan., p. 70

O

Off-shore oil rig is welded, May, p. 54
Ohio bridge assembled within 36 hours, April, p. 94
**150-ton hammer base saved by welding,** Oct., p. 88
One-side sub-arc welding for shipbuilding, March, p. 51
Open-arc increase job capacity, Nov., p. 82
Orbiting astronomical observatory's circuits welded, April, p. 56

P

Parade floats rely on welded steel, Feb., p. 55
**Partial vacuum EB welder developed,** June, p. 92
Pedestrian overpass with reverse-curved girders, Feb., p. 76
**Physics in welding** — I, Dec., p. 52
**Pick bronze for joining versatility,** Sept., p. 50 (Part I); Oct., p. 78 (Part II)
Pipeline construction facilitated by fine-wire Mig, Jan., p. 70
Pipeline weldind in South Africa, July, p. 79
Pipeline welds are x-ray inspected, Nov., p. 46
**Planning, training help firm meet tough weld specs,** May, p. 86
Plant welding management and mismanagement, July, p. 70
**Powdered metal, oxyacetylene reclaim valves,** June, p. 88
**Power system casings joined by sub-arc,** Oct., p. 92
**Portable hydraulic extrusion rig cuts weld time 40%, grinding 50%,** April, p. 82
**Preheat gray iron before welding,** April, p. 104
**Pressure vessels, automate or die,** Sept., p. 37
**Pressure vessels, take one giant step,** Nov., p. 41
Preweld cleaning time, hot to reduce, Oct., p. 74
Production by cast-weld and composite construction methods, Feb., p. 48
Products pulling more interest in welding field, Fact File, p. 12
Profits, costing and incentives, July, p. 13
Projection welded pail ears, Sept., p. 76
**Projection welder attaches tinware handle, mountings,** Feb., p. 68

R

Radiographic inspection of pipelines, Nov., p. 46
Radiography vs fluoroscopy in NDT, June, p. 41
Rebuilding kiln trunnions, May, p. 82
**Resistance welding improved with refrigeration unit,** Sept., p. 86
**Restraint and stress corrosion cracking,** Aug., p. 58
Ripper attachment for tractor weld-designed, Feb., p. 58

Rocket fuel cases; the metals and welding processes, April, p. 59
Rod mill guide rollers hardfaced, Aug., p. 43
Rose Bowl parade floats of welded construction, Feb., p. 55
RW circuits in "observatory" satellite, April, p. 56
**RW galvanized steel — new schedule,** May, p. 56
RW: Handle mountings attached to tinwear, Feb., p. 68
**RW: Pail ears projection welded at 4,800/hr.,** Sept., p. 76
**RW transformers — a design improvement,** March, p. 82

**S**

Safety, 1966 annual congress, Oct., p. 52
Safety can for flammable liquids reduces hazards, Aug., p. 70
Safety procedures with arcs and flames, Feb., p. 72
Safety, welding checklist, May, p. 76
**Selecting an incentive program,** July, p. 43
**Semiautomatic $CO_2$-Mig becomes firm's "standard",** May, p. 94
**Shielding gases: Mix 'n' match to suit the job,** May, p. 51
Shorting arc- process produces lawnmower rotors, April, p. 115
**Six welded buildings win awards,** Jan., p. 66
**Slag and tungsten inclusions,** April, p. 72
Solder, special technique repairs electromagnet, Oct., p. 95
Soldering a cupola in South America, July, p. 74
Spacecraft, welding research for, April, p. 45
Statistics for welding . . . 1965, Fact File, p. 9
Steel Sales Corp., 50 year anniversary, Feb., p. 86
**Steel steps out,** Jan., p. 55
Steel in modern churches' welded design, Aug., p. 68
Steels, maraging, how to weld them, Aug., p. 37
Structural frame design for crawler tractor is welded, April, p. 116
**Structural tubing lowers costs,** Feb., p. 78
Structural welding in building construction, Jan., p. 53
Structural welding — steel steps out, Jan., p. 55
Structural welding — Chicago Civic Center, Jan., p. 56
Structural welding — Wells Fargo building, Jan., p. 50
**Stud welding saves $26,550 on stainless test chambers,** Dec., p. 86
Sub-arc buildup, HF provide profits, March, p. 76
**Sub-arc fabricates reversed curve box girder for overpass,** Feb., p. 76
**Sub-arc HF renews diesel wheel life,** March, p. 80
Sub-arc welding of ships from one side, March, p. 51
Submerged-arc joins power system castings, Oct., p. 92
**Switch to open-arc keeps jobs "in shop",** Nov., p. 82
Symbol for welded products announced, May, p. 101

**T**

**Tailor-made structurals: the designer's dream come true,** Jan., p. 62
**Tallest west of Dallas,** Jan., p. 58
Teen-age weldors show projects, June, p. 94
**Tester points up machine design revolution,** March, p. 78
**The idea exchange,** Dec., p. 82
**Think flame sprayed zinc for metal furniture,** Oct., p. 89
**Thinking thin? Think Tig,** Nov., p. 35
Tig-Borium process improves hardfacing results, Feb., p. 84
Tig replaces rivets in motor stators, May, p. 96
Tig with filler produces aluminum autoclave, Oct., p. 94
**Tips on welding of cast iron,** Sept., p. 80
Titanium Tig welding, study of shielding methods, Sept., p. 40
**To help fabricate ships: stack the welders,** Aug., p. 72
**To "muffle" a nuclear rocket engine: welded stainless,** Dec., p. 84
Tractor crawler frame, design stages, April, p. 116
Trailer, heavy-duty, passes 100-ton test, Feb., p. 60
**Training program for union instructors,** Dec., p. 66
Training program, preparation, aid in fabrication project, May, p. 86
Transformer, RW, a design improvement, March, p. 86
Transformer, RW, a design improvement, March, p. 82
**True all-position electrodes: take one giant step,** Aug., p. 44
**Trunnion rebuilding nets cement firm $15,000,** May, p. 82
**Twenty safety tips,** May, p. 76
Twin-hulled oil drilling vessel is welded, May, p. 54
**Two Texas projects use same high-strength steel,** Aug., p. 66

**U**

**UCC boosts gas complex to nation's largest,** Sept., p. 92
**UW prof conducts summer welding course in India,** Sept., p. 78
**Ultrasonic view of a spotweld; magnetic field where it's needed,** Nov., p. 44
Ultrasonics as an NDT method reviewed, June, p. 48
**Ultrasonics: big noise in aluminum joining,** Dec., p. 39
**Ultrasound tests integrity of highly stressed welds in Angels' new stadium,** Jan., p. 60
Uniforms aid worker safety, appearance, July, p. 75

**V**

Valves restored to service by hardfacing, June, p. 88
Vertical-down electrodes introduced, Aug., p. 44
Vessels for high-pressure jobs fabricated rapidly, Nov., p. 41

**W**

Wear strips of chrome-alloy are abrasion resistant, Jan., p. 68
**WE's Jefferson honored sixth time in four years,** Aug., p. 63
**Weld chamber vital to reactor fuel elements,** Feb., p. 88
Weld defects, incomplete fusion and lack of penetration, June, p. 78
**Weld surface contour variations,** Nov., p. 60
**Weld symbol adopted,** May, p. 101
**Welded domes add space at low cost,** July, p. 76
**Welded steel bridge outbids concrete, meets 36-hr time limit,** April, p. 94
**Welded steel goes to the Rose Parade—every year,** Feb., p. 55
Welded steel supercedes castings in machinery design, March, p. 78
Welders stacked for ship fabrication, Aug., p. 72
**Welding again featured in prize bridges,** May, p. 97
Welding, automation of, Nov., p. 37
**Welding copper-nickel alloys,** Jan., p. 74
Welding cost formulae, July, p. 45
Welding details for Apollo-Saturn spacecraft, April, p. 49
Welding Engineer founder, L. B. Mackenzie, Jan., p. 50
**Welding in the space race,** April, p. 45
**Welding industry: 1965,** Fact File, p. 9
**Welding lends a hand at Canada's Expo 67,** April, p. 112
Welding management and plant policies reviewed, July, p. 70
**Welding on one side only? Use consumable weld inserts,** Nov., p. 78
Welding problems solved by NASA, July, p. 68
Welding Show, 1966, May, p. 102
**Welding the maraging steels,** Aug., p. 37
Welding with laser, on three jobs, Sept., p. 46
Welding with Mig, know the factors, Oct., p. 41
**Weldment redesign cuts labor costs 63%; improves product with fewer parts,** May, p. 90
Weldors trained in college program, July, p. 72
Wells Fargo Bank building, a welded structure, Jan., 58
**What teen weldors are doing,** June, p. 94
**What's happening to welding in building construction?,** Jan., p. 53
**What's new in heavy section welding,** March, p. 45
**When you think Hawaii, think welding,** June, p. 64
**Where do we go from here?** Fact File, p. 6
**Winning "Welded Product" symbol to debut at AWS convention,** April, p. 90
Wisconsin professor instructs welding classes in India, Sept., p. 78
**Workers solder copper cupola,** July, p. 74

**X-Y**

X-ray inspection checks spacecraft launch towers, April, p. 53
**You can't just Mig weld,** Oct., p. 41



Circle No. 210 on Welding Info-Aid Card

CHF

Fuse-Well

66

Produces clean, high luster easily machined welds with maximum strength in a nickel/copper rod (45,000 to 50,000 PSI, Tensile)

*Write for facts and price list*

CHICAGO HARDWARE FOUNDRY CO.

North Chicago, Illinois

KEEP IT UNDER YOUR HAT!

Comfort®

WINTER LINERS

NEW STRETCH winter liners give you maximum protection and comfort in all weather and working conditions. STRETCH FITTED . . . mold to individual head size up to 7½. FIREPROOF & WASHABLE. Also complete line of popular standard styles. COMFORT liners fit all types of safety hats and caps.

Write for name of distributor and catalog of other Comfort Line head gear and safety equipment.

O.K.I. SUPPLY CO.
P. O. Box 37717
Cincinnati, Ohio 45237

Circle No. 211 on Welding Info-Aid Card